

We CLAIM:

1. The electronic warfare method of determining a location of a distant electromagnetic energy emitter with respect to an aircraft, an aircraft carrying a plurality of segregated electronic warfare antennas and receiving signals from said emitter via an extended emitter to aircraft path and said plurality of antennas, said method comprising the steps of:

determining an angle of arrival vector for signals received at said aircraft and said aircraft carried electronic warfare antennas from said distant electromagnetic energy emitter;

said step of determining an angle of arrival vector including pre calibrating selected angle of arrival accuracy-determining dimensional and location characteristics of said plurality of electronic warfare antennas using known standard signals of compatible frequency with that of said distant electromagnetic energy emitter signals;

said pre calibrating of selected angle of arrival accuracy-determining dimensional and locational characteristics of said plurality of electronic warfare antennas including calibration to a phase center location in each of said electronic warfare antennas; and

deriving from said angle of arrival vector a range and angle vector connecting said distant electromagnetic energy emitter with a calibrated location of said electronic warfare antennas.

2. The electronic warfare method of determining a location of a distant electromagnetic energy emitter with respect to an aircraft of claim 1 wherein said known standard signals, in said step of pre calibrating selected angle of arrival accuracy-determining dimensional and location characteristics of said plurality of electronic warfare antennas using known standard signals, are global position system signals received via said electronic warfare system and said plurality of antennas.

3. The electronic warfare method of determining a location of a distant electromagnetic energy emitter with respect to an aircraft of claim 1 wherein said plurality of electronic warfare antennas are two in number.

4. Signal source locating apparatus comprising the combination of:  
a ground based source of microwave frequency electrical signals;  
an aircraft carried radio frequency receiving and signal processing apparatus compatible with said ground based source of microwave frequency electrical signals;

said radio frequency receiving and signal processing apparatus including first and second signal receiving antenna members carried by said aircraft and generating angle of arrival related electrical signals in response to signals received from said ground based source of microwave frequency electrical signals;

a source of standardized physical measurement calibration electrical signals of compatible frequency with said ground based source of microwave frequency electrical signals;

means for calibrating selected portions of said electronic locating apparatus including location error generating dimensional portions of said first and second signal receiving antenna members carried by said aircraft in response to said standardized physical measurement calibration electrical signals; and

signal location processing apparatus operative on said angle of arrival related electrical signals and generating electrical signals representing relative location of said ground based source of microwave frequency electrical signals with respect to said aircraft.

5. The signal source locating apparatus of claim 4 wherein said source of standardized physical measurement calibration electrical signals of compatible frequency with said ground based source of microwave frequency electrical signals is comprised of a global position system satellite.

6. The signal source locating apparatus of claim 4 wherein said means for calibrating selected portions of said electronic locating apparatus including location error generating dimensional portions of said first and second signal receiving

antenna members carried by said aircraft in response to said standardized physical measurement calibration electrical signals includes an implemented differential global position system carrier phase responsive algorithm.

7. The signal source locating apparatus of claim 4 wherein means for calibrating selected portions of said electronic locating apparatus including location error generating dimensional portions of said first and second signal receiving antenna members carried by said aircraft in response to said standardized physical measurement calibration electrical signals includes antenna phase center dimensional portions of said first and second signal receiving antenna members.

8. The signal source locating apparatus of claim 4 wherein said signal location processing apparatus operative on said angle of arrival related electrical signals and generating electrical signals representing relative location of said ground based source of microwave frequency electrical signals with respect to said aircraft further includes signal location processing apparatus operative on said electrical signals representing relative location of said ground based source of microwave frequency electrical signals with respect to said aircraft and generating signals representing relative location of said ground based source of microwave frequency electrical signals with respect to a global position.

9. The signal source locating apparatus of claim 4 wherein said ground based source of microwave frequency electrical signals comprises a radar apparatus.

10. The signal source locating apparatus of claim 4 wherein said apparatus further includes a signal frequency converting mixer element.

11. Airborne electronic warfare signal source locating apparatus comprising the combination of:

- a ground based threat source of microwave frequency electrical signals;
- an aircraft carried combined electronic warfare and global position system radio frequency receiving and signal processing apparatus compatible with said ground based threat source of microwave frequency electrical signals;
- said combined electronic warfare and global position system radio frequency receiving and signal processing apparatus including first and second

aircraft fuselage mounted signal receiving antenna members generating angle of arrival related electrical signals in response to signals received from said ground based threat source of microwave frequency electrical signals;

a calibration source of global position system electrical signals of compatible frequency with said ground based threat source of microwave frequency electrical signals;

means for characterizing selected portions of said electronic locating apparatus including location error generating dimensional portions of said first and second aircraft fuselage mounted signal receiving antenna members in response to said calibration global position system electrical signals; and

signal location processing computer apparatus connected with said angle of arrival related electrical signals and generating electrical signals representing relative location of said ground based source of microwave frequency electrical signals with respect to said aircraft.